Improving RPMS Data Quality

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Improving RPMS Data Quality

- Why is data quality important?
- How does data get into the RPMS?
- What does research show?
- Initiatives to improve data quality
- Future directions

High quality data is critical for...

- Individual patient care
- Population-based health care
- Financing healthcare
- Managing healthcare
- Medical-legal requirements

Data Quality Needs Vary by Intended Use

Individual patient care

versus

Population-based analyses

Data Quality in RPMS

- Why is data quality important?
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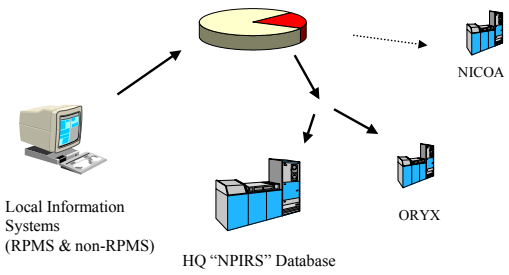
Data Flow Process

- Data collected as a service is provided.
- Data recorded on an encounter form, transcribed, etc.
- Data entry clerk enters data into RPMS application.
- Data passed to the central PCC repository.
- Data exported from the PCC repository to Area.
- Data exported from Area to HQ.
- Data at HQ analyzed to produce various reports.

IHS Data Repositories



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Childhood Obesity – One Site

- 181 patients – 3 thru 5 yr/olds
- 491 of 559 (87.8%) visits in the written chart
- 556 of 559 (99.4%) visits in PCC
- All 68 (12.2%) visits not found within the facility's charts, were visits to outlying clinics within the SU

Childhood Obesity – One Site

For visits that were both in PCC and the chart

- PCC data = written chart data for 1,436 of 1,473 (97.5%) individual data elements
- RPMS data had errors for 27 (4.8%) of total visits
- Of these
  - Data element completely omitted for 15 (3.1%) visits
  - Data entered incorrectly for 13 (2.6%) visits
  - One visit had both omitted and incorrectly entered data

Childhood Obesity – One Site

	Normal	*At Risk*	*Overwt*	*No Data*
Chart Data	23.3%	5.5%	4.4%	65.2%
PCC Data	26.5%	6.6%	6.1%	59.1%
Best Available Data	28.7%	6.6%	5.5%	56.9%

Childhood Obesity – One Site

For those children who had different classifications based on PCC versus chart data:		
	# Yes	**%**
For how many patients did the chart correct a classification due to erroneous PCC data?	5	2.8%
For how many patients did PCC data allow a classification not otherwise possible because the data was not in the study facility chart?	15	8.3%

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Paps – One Site

Number of denominator patients who had a Pap between 7/1/98 and 3/31/99

Total # of Patients = 185

	#	%
According to HQ database (using ICD diagnoses and procedure codes)	29	15.7%
According to chart reviews	50	27.0%
According to local Lab Pkg data	67	36.2%
According to PCC data (Qman search for Pap)	70	37.8%
According to best available data (verified data from any of the four sources)	69	37.3%

Paps – One Site

Percentage of patients with Paps between 7/1/98 and 3/31/99 missed (or overcounted)

	#	%
HQ data (ICD diagnoses and procedure codes)	40	58.0%
Chart reviews	19	27.5%
Local Lab Package data	2	2.9%
Local PCC data (Qman search for Pap lab test)	-1	-1.4%

Paps – One Site

Comparison of Lab Package record of Pap versus best available data

		Best Available Data: Yes	Best Available Data: No	
Lab Package Data	Yes	67	0	67
	No	2	116	118
		69	116	185

Sensitivity	97.1%
Specificity	100.0%
Positivte predictive value	100.0%
Negative predictive value	98.3%

Paps – One Site

Comparison of PCC record of Pap versus best available data

		Best Available Data: Yes	Best Available Data: No	
PCC Data	Yes	68	2	70
	No	1	114	115
		69	116	185

Sensitivity	98.6%
Specificity	98.3%
Positivte predictive value	97.1%
Negative predictive value	99.1%

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Diabetic BP Control – Five Sites

Number of Individuals with Diabetes Whose BPs Were In Control

	# Individuals	HQ Data	Chart Data	Best Available Data
Facility A	198	107 (54.0%)	108 (54.5%)	108 54.5(%)
Facility B	199	45 (22.6%)	44 (22.1%)	44 (22.1%)
Facility C	171	99 (57.9%)	98 (57.3%)	98 (57.3%)
Facility D	233	95 (40.8%)	95 (40.8%)	95 (40.8%)
Facility E	201	60 (29.9%)	60 (29.9%)	60 (29.9%)
Overall	1002	406 (40.5%)	405 (40.4%)	405 (40.4%)

Diabetic BP Control – Five Sites

Comparison of Assessment of Control Based on HQ versus Chart Data

		Chart Data: Yes	Chart Data: No	
HQ Data	Yes	438	8	446
	No	7	549	556
		445	557	1002

Observed Agreement	99%
Kappa	0.97

Diabetic BP Control – Five Sites

Why is this measure so accurate?

- BPs are reliably entered into PCC
- The measure depends on a statistical manipulation of multiple service points.

Even if some BPs are omitted or entered erroneously, as long as the errors are not biased, a population level measure will be accurate - the errors cancel out!

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Dental Exams – Four Sites

Numbers of Individuals With Diabetes Who Had a Dental Exam Within the Specified Study Period

	#	HQ Data		Chart Data		Best Available Data	
	Individuals	#	%	#	%	#	%
Facility A	238	70	29.4%	70	29.4%	70	29.4%
Facility B	200	71	35.5%	71	35.5%	71	35.5%
Facility C	198	56	28.3%	56	28.3%	56	28.3%
Facility D	200	52	26.0%	52	26.0%	52	26.0%
Overall	836	249	29.8%	249	29.8%	249	29.8%

Dental Exams – Four Sites

Agreement In Visit Data Between the Written Chart and HQ Data

	Total Visits	Visits with Errors		Visits Missing from HQ		Visits Missing from Chart		HQ Missed Dental Exam		HQ and Chart Matched	
	#	#	%	#	%	#	%	#	%	#	%
Facility A	3,912	12	0.3%	5	0.1%	2	0.1%	5	0.1%	3,900	99.7%
Facility B	2,508	17	0.7%	3	0.1%	3	0.1%	11	0.4%	2,491	99.3%
Facility C	3,822	22	0.6%	17	0.4%	0	0.0%	5	0.1%	3,800	99.4%
Facility D	4,411	5	0.1%	4	0.1%	0	0.0%	1	0.0%	4,406	99.9%
Overall	14,653	56	0.4%	29	0.2%	5	0.0%	22	0.2%	14,597	99.6%

Dental Exams – Four Sites

- Remarkable agreement between HQ data from PCC and the written chart
  - Sites with on-site dental clinic
  - Dental clinic uses RPMS

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HIV Diagnosis – Multiple Sites

- One State, one Area, and multiple Service Units
- ICD diagnosis search in PCC
- Matched "hits" with State's registry
- If not confirmed, chart review
- If still not confirmed, more intensive PCC search and chart review to research why

HIV Diagnosis – Multiple Sites

ICD-9 codes suggesting HIV infection

042. – 044.9	Symptomatic HIV/AIDS
795.71 – 795.8*	Non-specific serologic evidence of HIV
V08.	Asymptomatic HIV infection

* These codes are not case defining for HIV. They were used in this search to increase its sensitivity.

HIV Diagnosis – Multiple Sites

Accuracy of PCC diagnostic codes in identifying individuals with HIV infection

	#	%
True Positives	85	85
Confirmed HIV+	82	82
Charts not available, but confirmed HIV+ from RPMS data	3	3
False Positives	15	15
Non-specific code, confirmed HIV-	3	3
HIV-specific code, confirmed HIV-	12	12
	100	100

HIV Diagnosis – Multiple Sites

Review of individuals whose HIV+ status could not be confirmed by state HIV database or chart review

Explanation	#
Miscode	10
Inaccurate provider recording	2
Recorded past history of HIV, subsequently disproved	2
Data entry error	1
Chart missing, but RPMS confirms HIV +	3
Total	18

HIV Diagnosis – Multiple Sites

Highly sensitive (99%) and specific (99%) test
Low prevalence in population (1%)

	Has Condition	Doesn't have Condition	
Positive Test	10	10	20
Negative Test	0	980	980
	10	990	1000

False positive rate = 50%
False negative rate = 0%

HIV Diagnosis – Multiple Sites

Highly sensitive (99%) and specific (99%) test
High prevalence in population (30%)

	Has Condition	Doesn't have Condition	
Positive Test	297	7	304
Negative Test	3	693	696
	300	700	1000

False positive rate = 2%
False negative rate = 0%

HIV Diagnosis – Multiple Sites

- How good are cardiac stress tests for diagnosing ischemic cardiac disease?
  - Pretty good in high risk situations
  - Not so good in low risk situations

HIV Diagnosis – Multiple Sites

- In low prevalence situations, results of simple ICD diagnostic searches should be supplemented by either
  - Chart reviews
  - More intensive PCC reviews

HIV Diagnosis – Multiple Sites

- How accurate were more intensive PCC reviews and chart reviews in confirming (or refuting) the results of ICD searches?
- Both PCC and chart reviews would have identified all but one of the false negatives

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Invasive Cervical Cancer

- One Area, multiple sites
- Can an ICD search accurately differentiate between invasive cervical cancer

  and

  Non-invasive cervical cancer, pre-malignant cervical disease, non malignant cervical neoplasms, non-neoplastic cervical disease, etc.

Invasive Cervical Cancer

- Compared to non-invasive cervical cancer, pre-malignant cervical disease, non malignant cervical neoplasms, non-neoplastic cervical disease, etc.

  Invasive cervical cancer is not that prevalent (fortunately)

Invasive Cervical Cancer

Highly sensitive (99%) and specific (99%) test
Very low prevalence in population (0.1%)

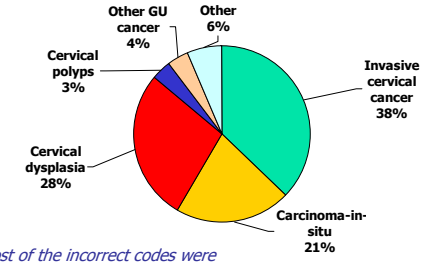
	Has Condition	Doesn't have Condition	
Positive Test	1	10	11
Negative Test	0	989	989
	1	999	1000

False positive rate = 91%
False negative rate = 0%

Invasive Cervical Cancer

- Because this is a very low prevalence condition in this population, we should expect a very high false positive rate

Invasive Cervical Cancer

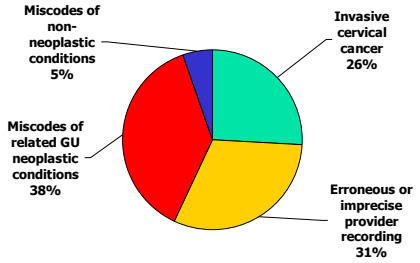


Most of the incorrect codes were for related conditions

Invasive Cervical Cancer

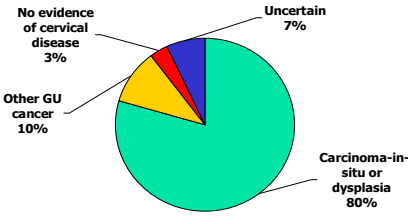
- Provider narratives were electronically examined at 2 sites – 93 (40%) of cases - to determine the reasons for the errors.

Reasons for Errors



Poor Provider Narratives

Narratives stated "Cervical Cancer" or "History of Cervical Cancer"



Invasive Cervical Cancer

Take home message?

Be very, very cautious if you utilize ICD codes to look for a condition or disease that has a relatively low prevalence compared to a closely related condition(s) in the population.

Always follow up this kind of search with a more thorough review of the electronic record or written chart.

Data Quality in RPMS

- Why is data quality important?
- How does data get into the RPMS?
- What does research show?
- Initiatives to improve data quality
- Future directions

Current Activities

- Classroom education
- Data quality assessment laptop application
- IHPES web site
- Assessments for Public Health Nursing

Classroom Education

- "Data Quality Improvement" course designed to train local staff how to conduct quality assessments at home facility.
- Presented at Phoenix area training site 3 times.
- Developed principally for GPRA and ORYX related issues.

Audience

- Quality manager/performance improvement
- Medical records
- PCC data entry staff
- Health care providers
- Anyone associated with performance measurement activities

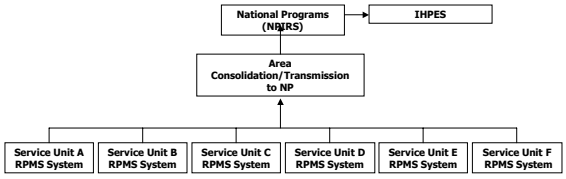
Course Content

- Driving forces for DQ improvement e.g. GPRA, accreditation, billing, compliance, workload, resource allocation
- Generating statistically valid sample size
- Creating "cohort" for assessment using PCC Q-Man
- Checking discrepancies using PCC Q-Man
- MS Excel spreadsheet to document and compute findings
- Exercises

Data Quality Laptop Assessment Application

- Designed to compare clinical data received at national programs to charts at local level
- Currently evaluates 4 clinical measures
- Statistically valid sample size and data from ORYX production database
- Assessment done on site
- Closeout report with findings and recommendations

How PCC Data Moves

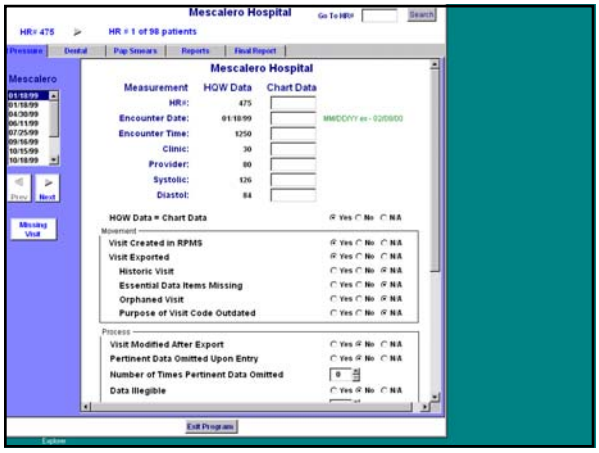


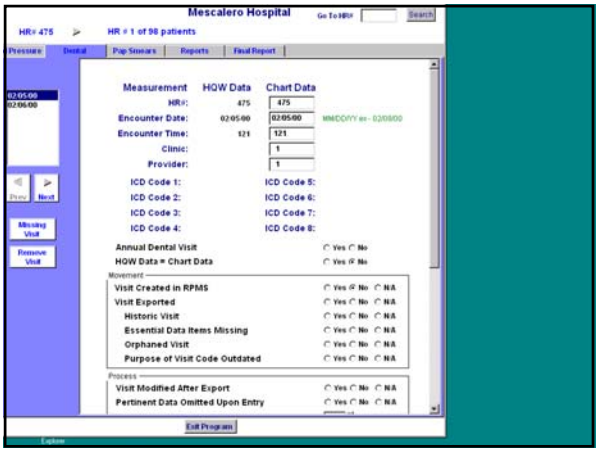
Potential Problem Areas

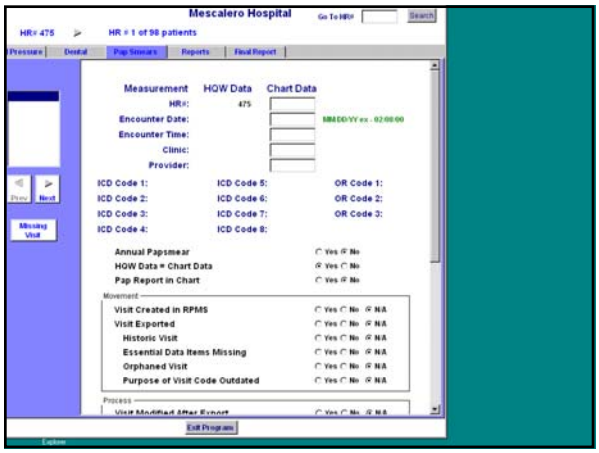
- Provider legibility, abbreviations
  - DM versus OM (Diabetes Mellitus versus Otitis Media)
- Data entry error(s) or omission(s)
- Outdated codes
- Visit never entered
- Visit not exported
- Area consolidation process
- "Historic" data captured?
- Was the transmitted data received?

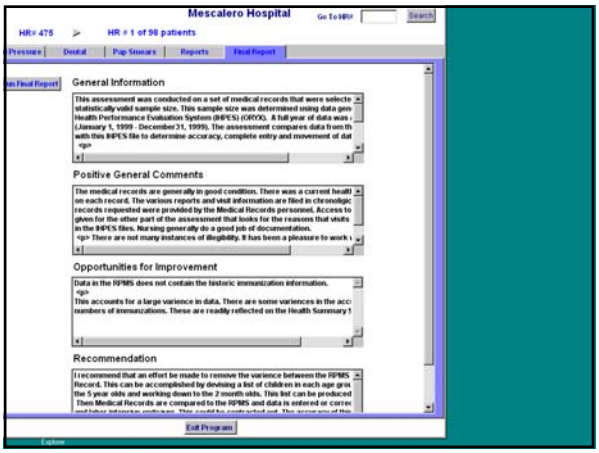
Assessment Package Looks At:

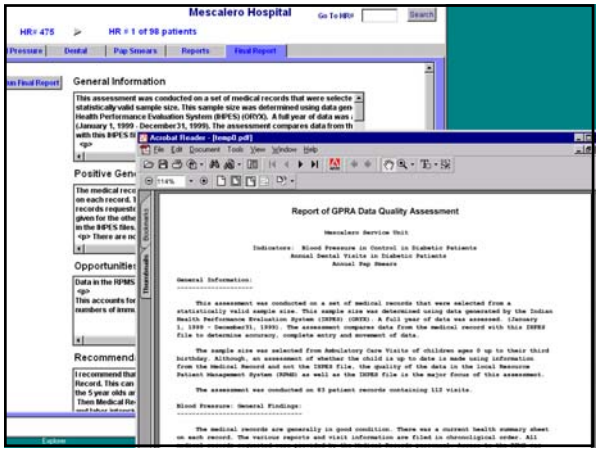
- Denominator file of patients with diabetes between 18 and 65 years of age
- Numerator events include:
  - Blood pressure under control
  - Annual dental visit
  - Females with PAP test





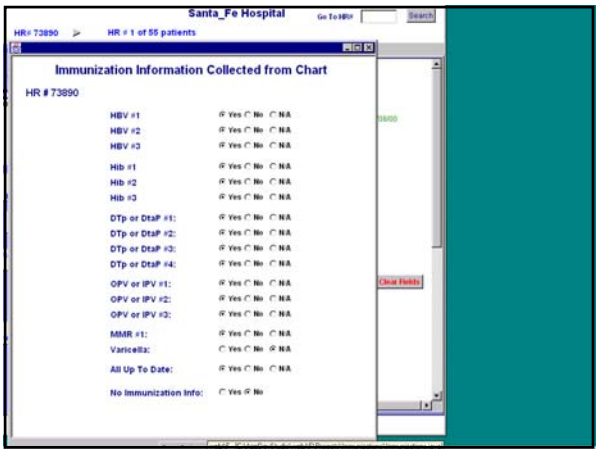


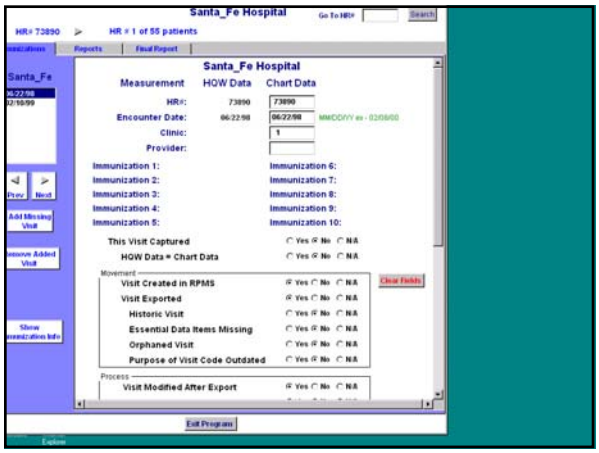


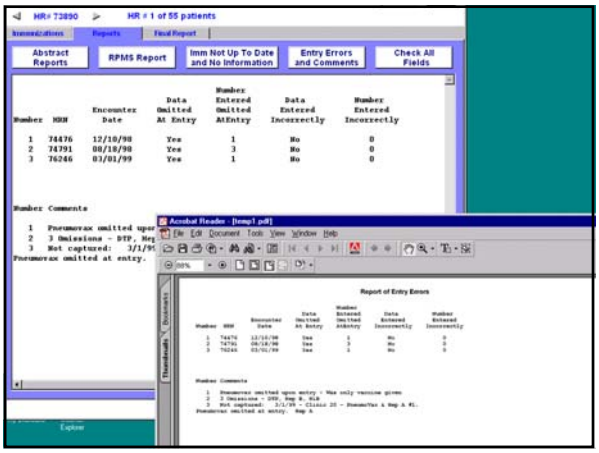


Immunization Assessment

- Immunizations up-to-date for 2 year olds

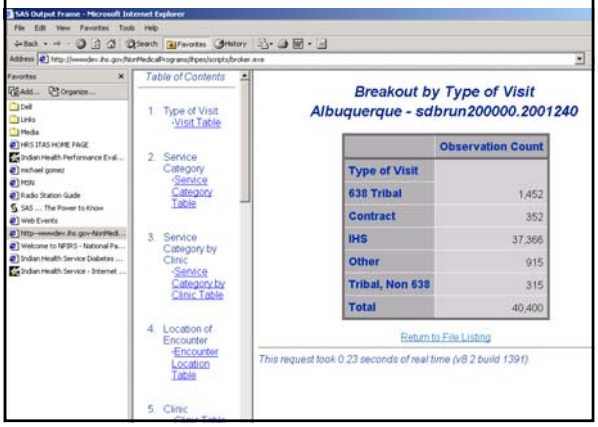






IHPES Web Site

- Reports on each area PCC export file received at national programs
- Verify coding
- Validate local export files received
- Validate "timeliness" of data received
- View area wide or service unit specific data



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PCC Export "Patch 6"

- Additional date fields to monitor and report on data movement activities
  - Date visit was created (entered)
  - Date visit was exported
  - Date visit was modified
  - Export file name
  - # PCC visits exported
  - # PCC visits skipped

Data Warehouse Activities

- Expanded "Tracker" to monitor PCC exports
- "Deviation from historical norms" graphics – has the site exported data consistent with previous volume?
- Proactive tracker – notify site if data falls below expected volume

Historical Norms Report

Possible GPRA Data Quality Measure

- "Improve electronic data collection data quality indicator" by:
  - Implementing a "regional" office RPMS PCC "data quality" assessment training at each IHS regional office.
  - Expand the current automated data quality assessment "package" to include 2 new additional clinical measures.

Data Quality is Continuous

- Remember - data quality is everyone's job